

Math 101

March 30, 2004

Exam 2

Name: _____ Instructor and Section: _____

There are 100 possible points on this exam and 5 extra credit points. Be sure to read each question carefully and answer the question asked. Show your work neatly and clearly—untidy answers and/or answers without justification may reduce your score. Partial credit may be given for a correct approach even if you don't get to the right answer. Give exact answers unless otherwise asked.

No calculators are allowed

GOOD LUCK!

Problem	Max	Score
1	14	
2	12	
3	10	
4	10	
5	6	
6	8	
7	10	
8	16	
9	8	
10	6	
TOTAL	100	
EC	5	

1. (14 points) Solve the following systems of linear equations. If the system is dependent or inconsistent, say so.

(a)

$$\begin{cases} 2x - 3y = 1 \\ 6y - 4x = -2 \end{cases}$$

(b)

$$\begin{cases} 3x + 2y = 8 \\ -2x + 3y = -1 \end{cases}$$

2. (12 points)

(a) Simplify the following

i. $\frac{(-2)^{-2}}{2^{-3}}$

ii. $\frac{(x^{-2})^{-2}}{(-x)^3}$

(b) Simplify the following expression so that no negative exponents appear in the final result and no variable appears more than once.

$$\frac{5^{-2}(-2x^{-1}y^{-2})^{-2}(5x^2y^{-2})^2}{(5x^2y)^{-2}(5x^{-2})^3}$$

3. (10 points)

(a) Find the product $(x - 1)(x^2 + x + 1)$

(b) Find the result with remainder of dividing $3x^4 + 3x^2 - 4x + 5$ by $x + 3$

4. (10 points) Given the polynomials: $-x^6 + 2x^5 + 2x^3 - 5x + 3$ and $x^6 - 2x^3 - 3$.

(a) Find the sum of the two polynomials.

(b) What is the degree of each of the polynomials? What is the degree of the result?

5. (6 points) A party mix is made by adding nuts that sell for \$5 per kg to a cereal mixture that sells for \$1 per kg. How much of each should be added to get 40 kg of a mix that will sell for \$2 per kg?

6. (8 points) A train travels 150 km in the same time that a plane covers 400 km. If the speed of the plane is 20 km per hr less than 3 times the speed of the train, find both speeds.

7. (10 points) Which ones of the following are polynomials and which are not? Justify your answer:

(a) $\frac{xyz}{2} + (xy)^2$

(b) $x^3 + \frac{x}{2y}$

(c) $x^3y^2 + 2yx^2 + z$

(d) $1 - x^4$

(e) $x^4 + 2x^3 + 3x^2 + 4x^{-1} + 5$

8. (16 points) Factor each of the following completely.

(a) $x^2(x - 1)^2 + 2x(x - 1)^2$

(b) $x^3 + 27$

(c) $x^3y^2 + 3 - 3y^2 - x^3$

(d) $2x^2 - 7x + 3$

9. (8 points) Solve each equation by factoring.

(a) $2x^2 + 5x - 3 = 0$

(b) $x^2 + 10 = 7x$

10. (6 points) The width of a rectangle is 1 less than the length. Knowing that the area of the rectangle is 30, find the dimensions of the rectangle.

11. EXTRA CREDIT (5 points) Solve the following system of linear equations:

$$\begin{cases} 2x + y + z + t = -1 \\ x + 2y + z + t = -4 \\ x + y + 2z + t = 1 \\ x + y + z + 2t = -6 \end{cases}$$